DEQ
Montana Department of Environmental Quality

Memo

TO: Nutrient Work Group

FROM: Members of the Nutrient Work Group Technical Subcommittee

DATE: March 16, 2017

SUBJECT: Findings on highest attainable condition and related topics

The subcommittee was proposed at the 1/24/2017 Nutrient Work Group meeting and held its first meeting on 2/9/2017. Altogether, the subcommittee met five times. The subcommittee's primary purpose was to examine the details of an effluent treatment-cost analysis report (Tetra Tech 2016), and to improve upon its findings with facility-specific information if time allowed. The subcommittee's goal was to identify highest attainable condition (HAC) for (primarily) mechanical facilities, using cost analyses and other technical information. Tetra Tech (2016) provides estimates of the cost for wastewater facilities to achieve six duel-nutrient effluent levels for total nitrogen and total phosphorus, respectively, as follows: 7 and 0.5; 7 and 0.1; 7 and 0.05; 3 and 0.5; 3 and 0.1; and 3 and 0.05 (all in mg/L).

The subcommittee covered a range of interrelated topics pertaining to the cost to treat wastewater effluent and how to identify HAC, including:

- Changes to the permitting process that would better reflect the variability in effluent likely to be encountered at low nutrient concentrations;
- What are the limits of wastewater technology;
- How combining optimization and facility upgrades can potentially achieve HAC;
- A careful review of the basic community data in Tetra Tech (2016), for example number of households, median household income, current sewer rates;
- Preparation of community-specific cost estimates, by subcommittee wastewater engineers, for the six treatment levels listed above;
- Inclusion of an estimate—probably low—of the future cost to address repairs and upgrades to community collection systems;
- High to low cost ranges to achieve the six treatment levels, based on Class 5 Planning Estimates (per Association for the Advancement of Cost Engineering);
- Other engineering factors, beyond treatment cost, which affect HAC (e.g., duel-nutrient control, optimization potential for the <1MGD discharge category); and
- Estimates of the cost for lagoon systems to meet a series of treatment levels similar to the six outlined above, based on a random sample of lagoon-based communities.

Based on our analyses, the subcommittee recommends that a fixed coefficient of variation (CV) of 0.6 be used when determining load-only average monthly limits for permitted nutrient variances. (The CV is used to derive the multiplier in Table 5-2 of EPA [1991].)

This change better reflects the variability in nutrient effluent that is likely to occur at low nutrient concentrations (i.e., concentrations near the HAC). No consensus was reached regarding the limits of wastewater technology, but it is clear that any definition must include whether the concentrations are absolute levels or consistently-achievable levels.

The subcommittee's wastewater engineers provided community-specific cost estimates for nearly all the facilities in the ≥1MGD discharge category, and for one facility in the <1MGD discharge category. This work greatly improved the accuracy of the cost estimates originally provided in Tetra Tech (2016). Based on this work, and other considerations outlined above, the subcommittee concludes that HAC is as follows:

≥1MGD discharge category: In the range of >3 to 7 mg TN/L, and >0.1 to 0.4 mg TP/L.

<1MGD discharge category: 7 mg TN/L and 0.5 mg TP/L were not affordable for the majority of the POTWs in this group. HAC is, therefore, at higher concentrations, and the subcommittee relied more on the potential for facility optimization—which can be extremely cost effective— to draw its conclusions. The subcommittee recommends a range of >>7 to 10 mg TN/L, and 1.0 mg TP/L for this discharge category.

Lagoon discharge category: None of the treatment levels were found to be affordable by a majority of the sampled communities. Land application was affordable for 38% of sampled communities, while the other technologies considered (e.g., replacement with a package mechanical plant) were not affordable by any of the communities in the sample. The subcommittee recommends no change to the current method of implementing general variances for communities with wastewater lagoons.

REFERENCES

Tetra Tech. 2016. Memorandum: State of Montana Wastewater System Nutrient Cost Estimates. To Tina Laidlaw, USEPA Region 8, from Victor D'Amato, PE, and Steven Geil. October 21, 2016.

EPA (U.S. Environmental Protection Agency). 1991. Technical Support Document for Water Quality-based Toxics Control. Office of Water, EPA/505/2-90-001.